

## **Adaptive Management & Monitoring**

This case study demonstrates how post-implementation monitoring programs developed during the NEPA process can help ensure that the predicted effects are consistent with what actually happens on the ground after implementation and provide for adaptive management to address changes in conditions and unforeseen consequences or results.

**Project:** Flower Garden Banks, Gulf of Mexico

**Practice:** Long-Term Monitoring and Adaptive Environmental Management

**Agency:** Minerals Management Service (MMS)

**Involved Parties:** MMS, Gulf Reef Environmental Action Team (GREAT), Oil and Gas Industry, NOAA

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**Dates:** *Began:* 1973 *Ended:* Ongoing

**Project Description:** MMS is responsible for leasing federal lands of the outer Continental Shelf (OCS) for oil and gas exploration and development. In the early 1970s, the oil and gas industry became interested in exploring operations in the deep water of the Gulf of Mexico. Early Environmental Impact Statements (EIS) documented the existence of thriving coral reef communities on two unique banks, the East and West Flower Garden Banks. Because of the potential sensitivity of the coral reefs to production, MMS sponsored public meetings beginning in 1973 that resulted in mutually accepted concepts to protect reef communities.

Based on the public meetings, MMS introduced an implementation method called a “stipulation” that specified upfront protective measures for the reef and reflected the initial uncertainty surrounding production in the vicinity of the Flower Banks. The stipulation was made part of each lease and was binding. The stipulation established a no activity zone (NAZ) and a four mile shunt zone around the reefs. The NAZ zone, where no production can take place, directly protects the reef from damage due to drilling, platform and pipeline placement, and anchors. The shunt zone, in which all effluent from the drilling process must be shunted to near the sea floor, was designed to prevent the drilling discharge from reaching the bank’s reefs and biota.

As part of the lease stipulation, oil and gas developers had to monitor the environmental conditions at production sites and at the banks themselves in accordance with MMS guidelines. The initially prescriptive approach was subject to adaptive environmental monitoring. As more was learned about the banks through

the environmental studies program and lessee monitoring, the original stipulation was modified – and continues to be modified – to reflect the best possible information. This data is used to modify the stipulation in active leases. For example, after several years of monitoring by MMS and the lessees, MMS determined that shunting was working. No damage was being done to the banks or adjacent biota. As a result, MMS reduced the stipulation for monitoring at production sites. However, monitoring also indicated that tourist boats visiting the reefs were causing damage by placement of their anchors. The monitoring data enabled MMS to work with the Gulf Reef Environmental Action Team (GREAT) to develop a solution for preventing anchor damage while not discouraging tourism.

In 1992, the Flower Garden Banks were designated as a National Marine Sanctuary under NOAA protection. MMS and NOAA continue to monitor the health of the ecosystem. The sanctuary manager from NOAA is also involved in all proposed oil and gas related activities near the Flower Gardens.

### **Value as a Practice:**

**Results:** This practice of long term monitoring has resulted in the protection of the Flower Garden Banks, with their eventual designation as a National Marine Sanctuary, while still allowing for oil and gas exploration and tourism. It has enabled MMS to develop creative solutions based on real data that resulted in environmental protection while meeting the needs of other stakeholders such as the oil and gas industry and tourists.

In addition, adaptive management of the Flower Banks resulted in a significant reduction in operation costs. As new information was gathered and analyzed in the monitoring process, the number of cruises and dives was significantly reduced and therefore lessened the annual cost of the program. Stepwise reduction in cost and associated activities, based on adaptive management principles, ensured that MMS received the same quality information needed to monitor the health of the banks.

**Challenges Overcome:** Implementation of an adaptive management approach overcame the challenges of resource management in successfully balancing the needs of oil and gas production and tourism with environmental protection. This approach also achieved results when there was little data as to the potential impacts of oil and gas exploration on the reefs. Monitoring led to the discovery that it was not the oil and gas exploration, but rather the tourist boats that were having certain adverse impacts on the reefs. This practice demonstrates successful approval of an action in a NEPA document where the data was incomplete and the outcome was therefore uncertain. Successful project implementation and environmental protection was achieved through the establishment of monitoring and subsequent corrective actions.

**Challenges remaining:** Funding for ongoing monitoring is a challenge. A steady funding source is necessary to continue the monitoring, but obtaining the necessary

funding is often difficult as managers may find it hard to understand the need for the continuous funding source for monitoring after the project itself has been implemented.